

responding to the ordinate on the tangent at two chains back. Then a line ranged forward parallel to this chord, and touching the curve at the middle point, will be the tangent required.

The above method will be found convenient, as it affords a facility for calculating tables for the versed sine of an arc of any radius from the one already obtained; for since the curvatures of circles vary inversely as their radii, a simple proportion will give the value of the versed sine of any other required. There is another method which is sometimes adopted by engineers, and recommended by its apparent simplicity, it is as follows:—Upon the tangent, A T, is taken any length, A D, as before; and from B is set off B D ($= \frac{AB^2}{\text{diameter}}$) perpendicular to A T, then the chord A D is produced to G, making D G equal to A B; and from G is drawn the perpendicular G E equal to B D, whence the points A D E are assumed to be in the circumference of the same circle, and other consecutive points are found by producing the chord D E as before, and setting off perpendiculars each equal to B D.

It is scarcely necessary to observe that this method is not only erroneous in principle, but the curve so obtained is not a segment of a circular arc, but, on the contrary, one where the radius of curvature is continually increasing.

In the *Mechanics Magazine*, No. 801, for December 15th, 1838, I gave an investigation of the principle, wherein it was shown that in arcs of small radii the error would be serious. G. HAWKINS.

IMPROVEMENT OF THE KING'S SCHOLARS' POND SEWER.

HAVING frequently observed considerable quantities of sewerage matter, as also silt, sand, stones, and other substances, lying upon the channel of the King's Scholars' Pond Sewer, between the outlet next the Thames, and Elliott's Brewery, at Pimlico, and as this accumulation creates not only an abominable nuisance to this improving neighbourhood, but also cost a considerable sum of money during each year in removing it, I beg to suggest a simple method by which very much of the nuisance so frequently complained of may be obviated, and at the same time the great expense which now attends its removal may be entirely done away with. But in the first place I will explain how these deposits and accumulations are produced.

There are two pairs of flood-gates at the outlet, which is 18 feet wide, one pair being scarcely or never used, but is intended to supply the place of the other should this ever get out of order. At every flux of the tide, and when it rises to the sill of the outlet, one pair of these gates is closed for the purpose of preventing the river-water from flowing into the sewer, which is by this means formed into a simple reservoir, and retains the whole of the sewerage matter, &c., that flows into it, from the time the gates are shut, till they are again opened, this being from four to five hours during every tide. Now as the sewerage-water accumulates or rises in the reservoir, the animal and vegetable refuse, and other substances, which are carried along in suspension by the velocity and action of the descending water, are thrown down, and thus become deposited and accumulated upon the channel; these substances being for the most part of greater specific gravity than that of the water; and, therefore, when it is still they settle and subside to the bottom. The gradient all along this portion of the sewer being very little, the water flowing down it here soon increases in height, and thus the action and force of the stream becomes very much expended at a considerable distance up the sewer; the lighter particles of matter being carried forward, while the more bulky and heavier, become deposited where the water loses its principal velocity.

Had scientific and proper principles of drainage been observed when this portion of the sewer was arranged and constructed, at least 5 feet more fall could have been given to it, so as to have brought the discharging sill of the outlet somewhat under low-water mark in the river, and which would not only have greatly improved the drainage of the lower portion of Westminster, by allowing the collateral sewers a greater gradient than they now have, but the increased fall would have

imparted such an amount of velocity and action to the descending stream at this part as would have prevented the deposition of matter, and consequently would have carried it direct into the Thames. The height of the water at each point in the reservoir varies considerably, it rising higher on those days when the water companies' mains are charged for the service of the public, and also during rains and storms. But it scarcely or never rises so high as high-water mark outside the flood-gates, and when the tide recedes to, or a little below, the level of the accumulated water in the reservoir or sewer, the gates are forced open by the superior pressure inside, and thus the water gradually and slowly sinks and flows out with the ebb tide, leaving the deposited matter upon the bed of the sewer.

Now what I propose in order to prevent these accumulations for the future is this: that the gates at the outlet be kept closed during each ebb tide, until it leaves the sill of the outlet. Then they should be opened and the descent of the current not having any thing opposed to it, such a high degree of velocity and scouring action would be by this means imparted to the stream, that it would raise up and carry along with it the substances which were deposited during the time the water was accumulating in the reservoir, and thus much of the stench which now infects this locality would be done away with, and great expense to the public saved also. AN OBSERVER.

THE GILLESPIE MONUMENT IN COMBER.

ON the 24th ultimo the monument recently erected to the memory of Major-General Sir Robert Gillespie, was publicly opened, upwards of 25,000 persons being present, including the members of 119 masonic lodges, many of whom had travelled miles to attend the ceremony. The monument consists of a well-proportioned square pillar and pedestal 55 feet high, divided into compartments on the four faces, on each of which is sculptured a representation of one of the principal scenes of Gillespie's career; and it is terminated by a statue of the General himself, holding his sword in his right hand. Gillespie having been distinguished as a freemason, the south side of the pedestal is sculptured with masonic devices. "Brother" Johnston, the architect, received much praise for the manner in which he had carried out the intention of the committee. The proceedings took a masonic character, and one of the speakers, Alexander Grant, Esq., of Derry, made some lengthened observations on the value and purpose of the Institution. He remarked especially on the manner in which it had withstood the destroying hand of time, and that its tendency was to effect good. "As Masons," said he, "we consider the entrance of a candidate into our order as typical of the entrance of all men on this their mortal existence. It inculcates the useful lesson of natural equality and mutual dependence—it instructs us in the universal principles of beneficence and charity, to seek the solace of our own distress, by affording relief and consolation to our fellow-creatures in the hour of distress and affliction. Above all, it teaches us to bend with resignation and humility beneath the chastening hand of the Almighty, at the same time to engrave his law in our hearts. Further, it instructs us to cultivate the intellectual faculties, and to trace it through the paths of heavenly science, even to the throne of Omnipotence. To our minds, thus modelled by virtue and science, masonry, however, teaches one great and useful lesson more; she leads us, by contemplation, to the closing hour of our existence. Masonry has been not only mental wealth to the poor man, but softened the asperities of life and lightened the dark shadows of adversity with a smile."

OLD GREYFRIARS' CHURCH, EDINBURGH.

—On the 10th instant, the preliminary operations for the demolition of this church were undertaken in the presence of the lord provost, and several other of the city authorities. By means of a large beam which was employed as a battering-ram, the large pillars which separated the southern aisle from the main one were levelled with the ground, bringing with them the whole of the roof which they supported, and leaving only the small portion covering the northern aisle standing.

ST. WILFRID'S ROMAN CATHOLIC CHAPEL, HULME.

A fortnight ago, the anniversary of St. Wilfrid's, Bedford-street, Hulme—which had been for some time closed for decoration—was reopened. According to a local paper the eastern end of the church has a spacious chancel, and two lateral chapels, one dedicated to the Virgin, and the other to St. Thomas of Canterbury. The chancel is between these; and it is to the decoration of this portion of the church that the congregation has been directing its efforts; and to aid in defraying the expenses of which, the collections of the day were made. The chancel is divided from the nave and lateral chapels by open screen-work of oak, the cusps and mouldings gilded and picked out with crimson. The screen next the nave is surrounded with a large rood, or crucifix, with figures of the Virgin-mother on one side, and St. John the Evangelist on the other, and on either side of these, three massive gilt standards bearing large wax lights. The chancel is of large dimensions, about 25 feet square, with an open timbered roof. To ensure the stability of the work, this, from roof-tree to floor, has received five or six coats of oil-paint, upon which the decorative work has been done, forming one glowing mass of gold and colour; and in design and execution it is described as being, for its extent, the richest specimen of polychromic painting in England. The eastern end is adorned with four windows of stained glass, and the south side with one, all executed by Mr. Wailes, of Newcastle-upon-Tyne. The roof of the chancel is of azure, thickly sprinkled with gold stars; the rafters of crimson and gold, with rosettes and scrolls. The walls are covered with a simple diapering of blue, white, and red, down to the level of the reredos (or screen at the back of the altar), when the pattern increases in intricacy of design, richness of colour, and the more profuse use of gold. At the extreme height of the eastern gable, on a gold ground enclosed in the mystical vesica piscis, is the figure of the Lamb, and below, in round medallions, are two angels in attitudes of adoration, clad in white robes, and bearing tapers. At the same level, along the side walls, are five other angels in robes of gold and crimson, bearing labels inscribed with sentences from the hymn, "*Gloria in Excelsis Deo*." On either side of the eastern window is a large full-length figure, one of St. Wilfrid, in whose honour the church is dedicated; and the other of St. Edward the Confessor. The upper part of the reredos has shields alternately bearing the family cognizance of St. Wilfrid, and the arms of the diocese of York, of which he was bishop. Beneath these again are seven medallions containing the heads of as many Anglo-Saxon bishops. The corbels are of crimson, with the emblem of our Lord's passion and death blazoned in gold; the reveals of the windows and arches are of a rich pattern; the mouldings of the arches, pascina and sedilia, the pillars of the reredos, and of the altar, are of burnished gold, which, mingling with, heightening, and relieving the rich profusion of colour with which the whole abounds, produces a gorgeous *coup d'œil*. The design was furnished by Mr. Welby Pugin, and executed by Mr. William Boardman, of Manchester; the heads and figures being painted by Mr. Keeling, of Manchester. No cost appears to have been spared upon the work.

ST. JAMES'S CHURCH, NORLAND, NOTTINGHAM.—This edifice was consecrated last week by the Bishop of London, but at present it is minus the steeple, a deficiency which necessarily detracts from its appearance. A subscription is, however, on foot, to enable the trustees to erect the steeple; and as the sum of only 250*l.* is wanting, it is expected that the object will be speedily accomplished. The seats, which are constructed very low, will accommodate 750 persons, and one half of them are free.

FINE ARTS IN EGYPT.—We learn from Paris, that the Pacha of Egypt proposes to establish an academy of the fine arts in Cairo, and that a number of young men have been sent at his cost to Rome to study painting and sculpture there, with the view of acting as the first professors.